

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of operating a solid oxide fuel cell having an anode and a cathode, the method comprising:

forming a first mixture comprising molecular oxygen and a compound having formula 1:



wherein R is alkyl, aryl, alkaryl, or ~~aralkyl~~ aralkyl;

heating the first mixture to a sufficient temperature of less than about 650°C to form a second mixture comprising carbon monoxide and molecular hydrogen; and contacting the anode of a solid oxide fuel cell with the second gaseous mixture.

2. (Original) The method of claim 1 wherein the compound having formula 1 is dimethyl ether.

3. (Original) The method of claim 2 wherein the second mixture further comprises methane.

4. (Original) The method of claim 1 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 3.0.

5. (Original) The method of claim 1 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 1.0.

6. (Cancelled)

7. (Currently Amended) The method of claim 1 wherein the first mixture is heated to a temperature of ~~at least~~ from about 450°C to about 650°C.

8. (Cancelled)

9. (Currently Amended) The method of claim 1 wherein the first mixture is heated to a temperature of from about 550°C to about [[650°C]] 600°C.

10. (Original) The method of claim 1 wherein the anode comprises a nickel-containing cermet.

11. (Original) The method of claim 1 wherein the anode comprises a component selected from the group consisting of nickel mixed with gadolina doped ceria, nickel mixed with yttria doped ceria zirconia, or nickel mixed with yttria doped zirconia.

12. (Currently Amended) The method of claim [[1]] 9 wherein the first mixture is formed by combining air and the compound having formula 1, the compound having formula 1 is dimethyl ether, the first mixture includes 33% by volume of dimethyl ether, and the first mixture is heated to a temperature of about 550°C.

13. (Original) The method of claim 1 wherein R is a C₁₋₆ alkyl.

14. (Currently Amended) A method of operating a solid oxide fuel cell having an anode and a cathode, the method comprising:

forming a first mixture comprising air and dimethyl ether;
heating the mixture to a sufficient temperature of less than about 650°C to form a second mixture comprising carbon monoxide, methane, and molecular hydrogen; and
contacting the anode of a solid oxide fuel cell with the second gaseous mixture.

15. (Original) The method of claim 14 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 3.0.

16. (Original) The method of claim 14 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 1.0.

17. (Cancelled)

18. (Currently Amended) The method of claim 14 wherein the first mixture is heated to a temperature of ~~at least~~ from about 450°C to about 650°C.

19. (Original) The method of claim 14 wherein the first mixture is heated to a temperature of at least about 550°C.

20. (Currently Amended) The method of claim 14 wherein the first mixture is heated to a temperature of from about 550°C to about [[650°C]] 600°C.

21. (Currently Amended) The method of claim 20 wherein the anode comprises Ni-Y₂O₃ stabilized ZrO₂ and (Ce, Y)O₂.

22. (Currently Amended) A fuel cell system comprising:
a source of a first mixture comprising molecular oxygen and a compound having formula 1:

CH₃-O-R

1

wherein R is alkyl, aryl, alkaryl, or ~~aralkyl~~ aralkyl;

a heat source that heats the first mixture to a sufficient temperature of less than

about 650°C to form a second mixture comprising carbon monoxide and molecular hydrogen; a solid oxide fuel cell having an anode and a cathode; and a conduit for contacting the anode of the solid oxide fuel cell with the second gaseous mixture.

23. (Original) The system of claim 22 wherein the compound having formula 1 is dimethyl ether.

24. (Original) The system of claim 22 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 3.0.

25. (Original) The system of claim 22 wherein the molar ratio in the first mixture of molecular oxygen to a compound having formula 1 is from about 0.1 to about 1.0.

26. (Original) The system of claim 22 wherein the second mixture further comprises methane.

27. (Cancelled)

28. (Currently Amended) The system of claim 22 wherein the heat source heats the first mixture to a temperature of ~~at least~~ from about 450°C to about 650°C.

29. (Cancelled)

30. (Currently Amended) The system of claim 22 wherein the heat source heats the first mixture to a temperature of from about 550°C to about [[650°C]] 600°C.

31. (Original) The system of claim 22 wherein the anode comprises a nickel-containing cermet.

32. (Currently Amended) The system of claim 22 wherein the anode comprises a component selected from the group consisting of nickel mixed with gadolina doped ceria, nickel mixed with yttria doped ceria zirconia, or nickel mixed with yttria doped zirconia. $[\text{D}\text{O}_2]$

33. (Cancelled)

34. (Currently Amended) The method of claim [[33]] 1 wherein the step of heating the first mixture produces less than about 10 weight % water and less than about 10 weight % carbon dioxide of the total weight of the second mixture.

35.-43. (Cancelled)